

## Lesson 5: Putting It All Together

### Classwork

#### Exercises 1–15: Polynomial Pass

Perform the indicated operation to write each polynomial in standard form.

1.  $(x^2 - 3)(x^2 + 3x - 1)$

2.  $(5x^2 - 3x - 7) - (x^2 + 2x - 5)$

3.  $(x^3 - 8) \div (x - 2)$

4.  $(x + 1)(x - 2)(x + 3)$

5.  $(x + 1) - (x - 2) - (x + 3)$

6.  $(x + 2)(2x^2 - 5x + 7)$

7.  $\frac{x^3 - 2x^2 - 65x + 18}{x - 9}$

8.  $(x^2 - 3x + 2) - (2 - x + 2x^2)$

9.  $(x^2 - 3x + 2)(2 - x + 2x^2)$

10.  $\frac{x^3 - x^2 - 5x - 3}{x - 3}$

11.  $(x^2 + 7x - 12)(x^2 - 9x + 1)$

12.  $(2x^3 - 6x^2 - 7x - 2) + (x^3 + x^2 + 6x - 12)$

13.  $(x^3 - 8)(x^2 - 4x + 4)$

14.  $(x^3 - 2x^2 - 5x + 6) \div (x + 2)$

15.  $(x^3 + 2x^2 - 3x - 1) + (4 - x - x^3)$

### Exercises 16–22

16. Review Exercises 1–15 and then select one exercise for each category and record the steps in the operation below as an example. Be sure to show all your work.

|                             |                                |
|-----------------------------|--------------------------------|
| <b>Addition Exercise</b>    | <b>Multiplication Exercise</b> |
| <b>Subtraction Exercise</b> | <b>Division Exercise</b>       |

For Exercises 17–20, re-write each polynomial in standard form by applying the operations in the appropriate order.

17.  $\frac{(x^2+5x+20)+(x^2+6x-6)}{x+2}$

18.  $(x^2 - 4)(x + 3) - (x^2 + 2x - 5)$

19.  $\frac{(x-3)^3}{x^2-6x+9}$

20.  $(x + 7)(2x - 3) - (x^3 - 2x^2 + x - 2) \div (x - 2)$

21. What would be the first and last terms of the polynomial if it was re-written in standard form? Answer these quickly without performing all of the indicated operations.

a.  $(2x^3 - x^2 - 9x + 7) + (11x^2 - 6x^3 + 2x - 9)$

b.  $(x - 3)(2x + 3)(x - 1)$

c.  $(2x - 3)(3x + 5) - (x + 1)(2x^2 - 6x + 3)$

d.  $(x + 5)(3x - 1) - (x - 4)^2$

22. What would the first and last terms of the polynomial be if it was re-written in standard form?

a.  $(n + 1)(n + 2)(n + 3) \dots (n + 9)(n + 10)$

b.  $(x - 2)^{10}$

c.  $\frac{(x-2)^{10}}{(x-2)}$

d.  $\frac{n(n+1)(2n+1)}{6}$

## Problem Set

For Problems 1–7, rewrite each expression as a polynomial in standard form.

1.  $(3x - 4)^3$

2.  $(2x^2 - x^3 - 9x + 1) - (x^3 + 7x - 3x^2 + 1)$

3.  $(x^2 - 5x + 2)(x - 3)$

4.  $\frac{x^4 - x^3 - 6x^2 - 9x + 27}{x - 3}$

5.  $(x + 3)(x - 3) - (x + 4)(x - 4)$

6.  $(x + 3)^2 - (x + 4)^2$

7.  $\frac{x^2 - 5x + 6}{x - 3} + \frac{x^3 - 1}{x - 1}$

For Problems 8–9: Quick, what would be the first and last terms of the polynomial if it was written in standard form?

8.  $2(x^2 - 5x + 4) - (x + 3)(x + 2)$

9.  $\frac{(x - 2)^5}{x - 2}$

10. The profit a business earns by selling
- $x$
- items is given by the polynomial function

$$p(x) = x(160 - x) - (100x + 500).$$

What is the last term in the standard form of this polynomial? What does it mean in this situation?

11. Explain why these two quotients are different. Compute each one. What do they have in common? Why?

$$\frac{(x - 2)^4}{x - 2} \text{ and } \frac{x^4 - 16}{x - 2}$$

12. What are the area and perimeter of the figure? Assume a right angle at each vertex.

